AMENDMENTS TO THE CLAIMS

Claim 1 (currently amended): A method for measuring the wave aberrations of the eye, based on probing the eye with a narrow laser beam, detection of the radiation scattered by the retina, measurement of the wave front tilt in the form of the first partial derivatives along the coordinates in a discrete set of pupil points with known coordinates, approximation of the wave front in the form of functions of pupil coordinates using ~~said~~ data from the detection of radiation scattered by the retina, and calculation of wave aberrations of the eye as deformations of the approximated wave front, characterized in that the partial derivatives at any pupil point are determined by means of spline approximation using the values in a discrete set of points, where the wave front tilts are measured, that are located along concentric circles with a common center which coincides with the center of coordinates, wherein the approximation of partial derivatives at the beginning is performed along each concentric circle and then along radii to the pupil points and the wave front is reconstructed by means of the numerical integration.

Claim 2 (currently amended): A method according to claim 1, wherein the wave front reconstructed by means of the numerical integration is along the radii to the pupil points with the initial point of integration located in the center of the pupil, where identical initial values of the integral are taken for all radii.

Claims 3-6 (canceled).

Claim 7 (currently amended): A method <u>according to</u> ~~as in~~ claim[[s]] 1, ~~or 4, or 6,~~ characterized in that the spline approximation along each coordinate is performed in accordance with the formula:

$$S(x) = \frac{(x_{i+1}-x)^2[2(x-x_i)+(x_{i+1}-x_i)]}{(x_{i+1}-x_i)^3}S(x_i) + \frac{(x-x_i)^2[2(x_{i+1}-x)+(x_{i+1}-x_i)]}{(x_{i+1}-x_i)^3}S(x_{i+1}) +$$

$$+ \frac{(x_{i+1}-x)^2(x-x_i)}{(x_{i+1}-x_i)^2}S'(x_i) - \frac{(x-x_i)^2(x_{i+1}-x)}{(x_{i+1}-x_i)^2}S'(x_{i+1}),$$

where $S(x)$ is the interpolation cubic spline along the generalized coordinate x; x_i, x_i+1 are the coordinates of the pupil points i and (i+1) from their discrete set, at which the wave front tilt is measured having corresponding values $S(x_i)$, $S(x_i+1)$; and $S'(x_i)$, $S'(x_i+1)$ are the values of the first derivative in the points x_i, x_i+1, which ensure continuity of the second derivative $S''(x)$ in these points.

Claim 8 (original): A method according to claim 2, characterized in that the numerical integration is performed in accordance with the formula:

$$W(P,\Phi) = W(0,\Phi) + \int_0^P \frac{\partial W(\rho,\Phi)}{\partial \rho} d\rho,$$

where $W(\rho,\varphi)$ is the wave front function, ρ--the coordinate along the radius, φ--the coordinate along the angle, (P,Φ) are the coordinates of arbitrary pupil point, and

$$\int_0^P \frac{\partial W(\rho,\Phi)}{\partial \rho} d\rho \approx \sum_{i=1}^{N} \frac{\partial W\left(\frac{\rho_{i-1}+\rho_i}{2},\Phi\right)}{\partial \rho}(\rho_i - \rho_{i-1})$$

the interval [0,P] being divided into *N* partial portions [ρ_i-1, ρ_i], so that i= $\overline{(1,N)}$.

Claim 9 (currently amended): A method according to claim[[s]] 1, ~~2, 3, 4, 5, 6 or 8,~~ characterized in that the calculation of wave aberrations is performed based on the wave front data reconstructed in the form of splines.

Claim 10 (original): A method according to claim 7, characterized in that the calculation of wave aberrations is performed based on the wave front data reconstructed in the form of splines.

Claim 11 (original): A method according to claim 1, characterized in that the reconstructed wave front is used for the purposes of vision correction.

Claim 12 (currently amended): A method for measuring the wave aberrations of the eye, based on probing the eye at a discrete set of pupil points with a narrow laser beam, detection of the radiation scattered by the retina, measurement of the wave front tilt values in the form of first partial derivatives along known coordinates of the discrete set of pupil points in a <u>rectangular</u> coordinate system, approximation of the wave front in the form of functions of pupil coordinates using data from the detection of radiation scattered by the retina, and calculation of wave aberrations of the eye as deformations of an approximated

wave front, wherein the first partial derivatives at any pupil point are determined by means of spline approximation using the data for the discrete set of pupil points, where the wave front tilt values are measured, that are located along straight lines which are parallel to an axis in the rectangular coordinate system and the wave front is reconstructed by means of numerical integration.

Claims 13-16 (canceled).

Claim 17 (currently amended): A method according to ~~as in~~ claim 12 [[16]], wherein an approximation of the partial derivatives is performed along each of the parallel straight lines, and then in orthogonal directions.

Claim 18 (currently amended): A method according to ~~as in~~ claim[[s]] 12, ~~15 or 17~~ wherein the spline approximation along each coordinate is performed in accordance with the formula:

$$S(x) = \frac{(x_{i+1}-x)^2\left[2(x-x_i)+(x_{i+1}-x_i)\right]}{(x_{i+1}-x_i)^3}S(x_i) + \frac{(x-x_i)^2\left[2(x_{i+1}-x)+(x_{i+1}-x_i)\right]}{(x_{i+1}-x_i)^3}S(x_{i+1}) +$$

$$+ \frac{(x_{i+1}-x)^2(x-x_i)}{(x_{i+1}-x_i)^2}S'(x_i) - \frac{(x-x_i)^2(x_{i+1}-x)}{(x_{i+1}-x_i)^2}S'(x_{i+1}),$$

where $S(x)$ is the interpolation cubic spline along the generalized coordinate x; x_i, x_i+1 are the coordinates of the pupil points i and (i+1) from their discrete set, at which the wave front tilt is measured having corresponding values $S(x_i)$, $S(x_i$+1);

and $S'(x_i)$, $S'(x_i+1)$ are the values of the first derivative in the points x_i, x_i+1, which ensure continuity of the second derivative $S''(x)$ in these points.

Claim 19 (canceled).

Claim 20 (currently amended): A method according to claim[[s]] 12, ~~13, 14, 15, 16, 17 or 19,~~ wherein the calculation of wave aberrations is performed based on the wave front data reconstructed in the form of splines.

Claim 21 (original): A method according to claim 18, wherein the calculation of wave aberrations is performed based on the wave front data reconstructed in the form of splines.

Claim 22 (original): A method according to claim 12, wherein the reconstructed wave front is used for the purposes of vision correction.

Claim 23 (new): A method according to claim 1, characterized in that one or both of the reconstructed wave front or the discrete set of pupil points is in a polar coordinate system.